

## Smart Chair

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**Abstract**— A medical system should give better medical amenities to individuals wherever in an inexpensive and enduring comfortably manner. Recently, the health-care system is going to change from an old approach to a new patient centered approach. In the old way the doctors perform the main role. For necessary analysis and advising they prerequisite to visit the patients. The two basic problems related to this approach, very first the doctors compulsory should present at place of the patient for 24 hours and second, in the hospital, patient remains admitted, wiring connected bio-medical instruments to bedside, for extensive span of time. The patient friendly approach has received to resolve these problems. This subject, the patients know with learning and data to predict a more dynamic part in illness conclusion, and avoidance. The imperative component of this subsequent approach is a solid and promptly accessible patient monitoring system (PMS). Health is the globally challenging thing for human beings. World Health Organization (WHO) says the highest achievable standard of health is an important right for a single. One can secure his lifetime income by maintaining his health. Healthy persons can reduce burden on the already overloaded sickbays, clinics, and medical specialists and decrease the job load on the public safety contributions, governmental or non-governmental centers and networks. To become human being healthy, a readily easy going current health-care system is essential.

**Key words:** Internet of Things, Sensors, Raspberry Pi, Machine Learning, Health Monitoring System

### I. INTRODUCTION

Health is a dynamic procedure which should be persistently monitored. Health sectors have been confronting different clinic affirmation issues because of increasing rate of patient admission to healing center. To this point, a framework is proposed for human social insurance. The framework gives customary observing of patient's metabolic parameters and infection identification utilizing the parametric esteems got. Because of increment in number of rapid death caused by chronic heart failure or high blood pressure, it is important to give constant health monitoring administration at home. The important objective is to build up a perfect patient monitoring system with the goal that the health-care specialists can observe the patients, who are in the hospital or executing their ordinary everyday work life. As of late, the patient monitoring systems is the real progressions due to its enhanced innovation. This framework estimates patient's parameters (Temperature, ECG, Heart rate etc.) using 3 distinctive available sensors. These sensors gathered information i.e. bio-metric data is given to raspberry pi and afterward it is exchanged to server.

### II. LITERATURE SURVEY

Arsalan Mosenia et. al. [1] proposed Medical Sensor-based System Design that can be worn. This system talks about different administrations, applications, and systems that could be created based on WMSs and reveals insight into their plan objectives and difficulties. Initially given a tiny history of WMSs and talk about how their market is developing. At that point talking about the extent of utilization's of WMS-based systems. Next, it portray the project of a run of the mill WMS-based system and the segments that establish such a system, and their constraints. From there on, recommendation for a rundown of alluring plan objectives that are based on WMS-based systems ought to fulfill. At last, examination of different research headings identified with WMSs and how past research considers have attempted to address the constraints of the segments utilized as a part of WMS-based systems and fulfill the attractive outline objectives.

According to Prakash Goud Patil [2] Health-care system based on fuzzy logic using Wireless Body Area Network. Wireless Sensor Networks (WSN) that provides the communication in healthcare systems. This sensor with progress Micro-Electro-Mechanical Systems (MEMS) innovation, make a Body Sensor Network (BSN) that consistently screens the unusual changes in health of patients. This anticipated system designed for determining health constraints of patient body in which it contains temperature and pulse sensor, this sensor is allied with Main Station through a microcontroller and that device have the ability to be control and monitored by distant computer. Wireless Sensor Network system uninterruptedly screening the pulse and temperature of patients at remote place or in hospital. This wearable device is designed to endlessly capture and send the bio-signals to the Doctors and Patients mobile phone. In that situation of emergency alert will be send to doctors, families, and ambulance in the form of Short Message Services (SMS). Specialist can likewise give remote medicine to the patient and this Data put inside the database and then after it is passed to fuzzy logic controller to enhance precision and this information is to be sent to the remote client. This applications main intention is to provide quick facility to Hospital. This paper proves wireless sensor networks can be widely used in health-care applications.

Ekta Madhyan Mahesh et. Al. [3] Next study is about Exclusive Health Care Monitoring Arrangement Using Sensors and ZigBee Technology. System purpose is to build the exclusive health-care monitoring system uses sensor and ZigBee Technology that can remotely measure and monitor the patient's physiological parameter of the body. The author shows this system how to measure and monitor system for Electrocardiogram (ECG), lung functioning (spirometer), heart rate and temperature signals. The details collected from patient via radio frequency and data displayed on the

displaying module such as computer screen or mobile devices and gathered information is sent through IP (GPRS or WI-FI) to a database server encompassing clinical data, and this stored data can be accessed on the small devices and this material can be shared with doctor at any time when they needed. The wireless bio-signal attainment System On-Chip for BSN application is applied to capture the real human body temperature, heart rate and ECG signal via IEEE 802.15.4 ZigBee. According to the real measurement results, health care can be acquired by the proposed WBSA-soc.

According to Arvind Bal Subramanian [4] Another proposed method is seeing Multidimensional Motifs in Physio-logical Signals for Personalized Health-care. Nowadays patient can be screened with the help of sensor present on the patient body. These sensors can be viewed personalized diagnosis and the therapy of the patient. Suppose that the patient having any anomalous changes in the body then this wearable device sensor sense changes and gather the information and informs that emergency to the family or doctor. In these paper, observation is that there is proposed Multidimensional Motif (MDM) discovery. These MDM is used for the capturing the patients physiological parameter. In previously proposed system the MDM have the Capability simultaneous processing and multiple dimension. The author proposed this system an efficient and real time approach for MDM discovery in the body sensor. There MDM monitoring the performance of the sick person during the therapy. These anticipated system permits the footage of patient analysis and speedy update and gain the data that are collect from the sensor. The device sensor on hand widely used that can be that can be monitored nonstop, the patient performance at the time of therapy from the exact analysis from the sensor. The doctor and medical care can be alert and provide proficient treatment to patient. The wearable device sensor collects the recording of the unidirectional and multidimensional data. The context aware approach is used for analyze the patient activity in semi supervised or in unsupervised manner for identifying patterns. Paper the author uses the MBM O Algorithm. The planned architecture has the scalability and efficiently of the approach that collects the online analysis and screen the patient in healthcare application.

Yena Kim et. al. [5] proposed Coexistence of ZigBee - based WBAN and Wi-Fi for Health Tele monitoring Systems. The telemonitoring concept can be used via Wireless Body Area Network (WBAN) that provide the home based mobile health monitoring. A wireless Body Area network (WBAN) in which having small sensor, this medical sensor is very intelligent that is gather the physiological parameter i.e. EKG (electrocardiogram), EEG (electroencephalography and the last one blood pressure can be monitored this healthcare application. These sensors are wearable on the patient body and collect the physiological parameters from patient and send to the moderator which is small mobile device. After that the coordinator sends this data through wireless network to the doctor clinic.

According to Benny P.L. Lo et. al. [6] Next paper based on a survey in which they explained that a Cardiovascular is the disease that is the major cause of the heart attack deaths in UK and from this disease 38% of all heart attack death in each year. Some patient has heart attack,

up to 29% people of them died before reaching to the hospital. This heart attack will happen without any indication. As of now, ECG (Electrocardiogram) Holter monitoring is for the most part utilized procedure for giving ambulatory cardiac monitoring to catching unsettling influences in the body. This Holter screen can record up to 24 hours of ECG signals, and the recorded information is along these lines recovered and investigated by a clinician. They can likewise distinguish and flag a notice continuously if any irregular changes in the body is caught.

### III. PROBLEM STATEMENT

In the proposed research work the created system can be provide the patient health monitoring and any disease recommendation using fuzzy classification approach. The data is collected from patient wearable devices using IoT framework. As a rule, the majority of the hospitals, manual assessment is done keeping in mind the end goal to gather the records of patient's condition.

### IV. SYSTEM ARCHITECTURE

Basically, proposed system has divided into two different phases, training and testing.

#### A. Training

- Collect data from internet like synthetic data as well as real time patient audit data.
- Apply data mining approaches like data preprocessing, data cleaning, data acquisition, outlier detection and data conversion.
- Once complete these phases data has saved into the database called as background knowledge, which is used at the time of time testing.

#### B. Testing

- First system creates the IoT-based healthcare system environment where system used 3 sensors as wearable devices.
- Then system have connected all sensors to Raspberry Pi, and gather all the data from sensors using batch processing approach.
- All composed data is store into global database using connection-oriented architecture.
- In testing system read all testing as well as training data simultaneously. Apply Fuzzy classifier and predict the possible using decision making system
- Finally provide the analysis accuracy with True positive and false negative of system.

First system collects all the health raw data using different sensors, with the help of Raspberry PI. Then whole generated information from sensor is collected by Raspberry pi, and process all data mining task on such data like data cleaning, data acquisition, outlier detection and store into MySQL cloud DB. In third section system introduce the GUI with the help of android base application and python webpage, where user can see the whole data interpretation as well. In some phase system also recommend some possibilities like possible disease, survival time of patient etc.

## V. PROPOSED SYSTEM

The interconnection between various parts is clarified utilizing the design of framework. Design outline is appeared in Fig. 1 and Fig. 2. The patients having sensors attached to their body and the other end of the sensors is attached with Raspberry Pi. The information procured by sensors is kept in the Raspberry pi B+. The information esteems (i.e. Biometric information) are appeared on LCD show and in the meantime if the qualities surpass the typical range, the alert triggers. The qualities put away are sent to server with the support of GSM. Every qualities are put away on the server and the latest esteem is shown on webpage. The specialist alongside their login accreditations can login and see the patient information. Specialists can see every single past record of a patient and recommend solutions and changes in remedy. Likewise, patients are given one of a kind client id and watchword to see their records. The outline of the framework is separated into two sections:

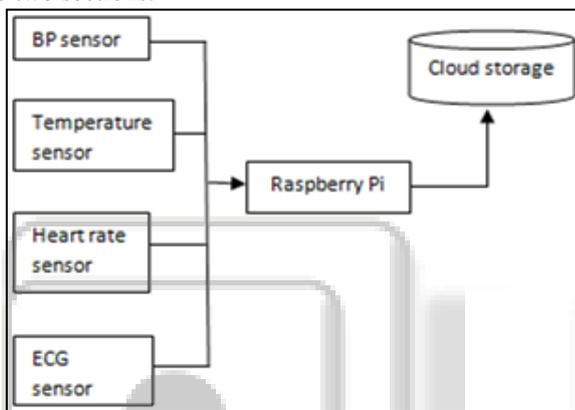


Fig. 1: Sensor Data Collection and Storage

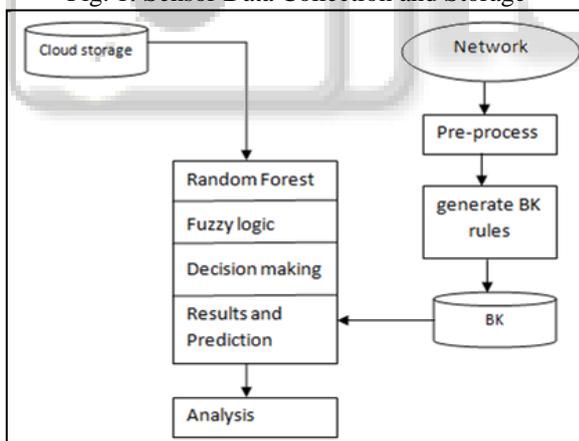


Fig. 2: Analysis and Prediction

## VI. HARDWARE COMPONENTS

### A. Temperature sensor (LM35)

It is a sensor used to quantify temperature. The LM35 series are exactness incorporated circuit temperature sensors, whose yield voltage is directly corresponding to the Celsius (Centigrade) temperature. It gauges temperature more precisely than indoor regulators. It is fixed and does not experience oxidation. It doesn't require yield voltage to be amplified.

### B. ECG Sensor

ECG electrode attached to the chest to pick up ECG signals. At that point wires are associated with AD8232. This sensor is a savvy board used to quantify the electrical action of the heart. ECGs can be amazingly loud, the AD8232 Single Lead Heart Rate Monitor goes about as an operation amp to help get a reasonable flag from the PR and QT Intervals effortlessly.

### C. Heart Rate Sensor

The sensor gives the advanced yield of warmth beat when a finger is put on it. At the point when the sensor sensing something, the LED flashes as one with beat. This is generated in Beats per Minute (BPM) rate.

### D. Raspberry Pi

The Raspberry Pi is a minimal effort, credit-card size PC that attachments into a PC screen or TV, and utilizations a standard console and mouse. The Raspberry Pi Model B+ has dual core ARM11 processor with 512MB SDRAM and powers through Micro USB socket of 5V. Sensors are attached with the Raspberry Pi Model B+. Raspberry Pi sends the data to servers through GSM module.

### E. GSM Module

It requires a SIM (Subscriber Identity Module) card simply like cell phones to enact correspondence with the system. The usage of GSM to send health data to webpage. This enables patient to leave the healing center yet at the same time he needs to remain in some known spots to guarantee the capacity to contact him in crisis cases. Indeed, even with this arrangement the patient can't move uninhibitedly and be a long way from his home.

### F. Max232

The MAX232 IC is utilized to change over the TTL/CMOS logic levels to RS232 logic levels amid serial communication of microcontrollers with PC. This makes it difficult to set up an immediate connection between them to communicate with each other. The middle of the road connect is given through MAX232. Low Supply Current 8 mA.

## VII. CONCLUSION AND FUTURE WORK

System provides real time health monitoring as well as disease prediction over the internet. It can work base on synthetic as well as real time training data. Accuracy of prediction is good than other learning approaches. System also having a capability to provide the alert when any criticalness 24\*7. For Future studies to implement a systems with parallel processing with high dimensional data using Hadoop or cloud environment.

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